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Pesticide Fact Sheet Number 164: Cyfluthrin

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16. Abstract (Limit: 200 words)

This document contains up-to-date chemical information, including a summary of the Agency's regulatory position and rationale, on a specific pesticide or group of pesticides. A Fact Sheet is issued after one of the the following actions has occurred.

1. Issuance or reissuance of a registration standard,
2. Issuance of each special review document,
3. Registration of a significantly changed use pattern,
4. Registration of a new chemical, or
5. An immediate need for information to resolve controversial issues relating to a specific chemical or use pattern.

17. Document Analysis a. Descriptors

Pesticides, regulations, Chemical Information Fact Sheet, Use Patterns, science findings.

b. Identifiers/Open-Ended Terms

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EPA

Pesticide Fact Sheet

Name of Chemical: Cyfluthrin
Reason for Issuance: Unconditional Registration
Date Issued: December 30, 1987
Fact Sheet Number: 164

1. DESCRIPTION OF CHEMICAL

Generic Name: Cyfluthrin (Cyano (4-fluoro-3-phenoxyphenyl) methyl 3-(2,2-dichloroethenyl)-2,2-dimethyl cyclopropanecarboxylate
Common Name: Cyfluthrin
Trade Name: Laser
EPA Shaughnessy Code: 128831-5
Chemical Abstracts Service (CAS) Numbers: 68359-37-5
Year of Initial Registration: 1987
Pesticide Type: Insecticide
Chemical Family: Synthetic pyrethroids
U.S. Producers: Mobay Chemical Company; Miles Laboratories, Inc.

2. USE PATTERNS AND FORMULATIONS

Application Sites: General indoor and domestic outdoor (ornamental areas)
Method of Application: localized spot treatment, crack and crevice and space sprays

Formulation Types:

a) Laser Ant and Roach Killer
0.1% Cyfluthrin
1.0% Piperonyl Butoxide
0.05% Pyrethrins

b) Laser Flying Insect Killer
0.04% Cyfluthrin
0.72% Tetramethrin
1.00% Piperonyl Butoxide

c) Laser Flea Killer Spray
0.01% Cyfluthrin
0.8% Chlorpyrifos
2.5% Pyrethrins
1.0% Piperonyl Butoxide

d) Laser Ant and Roach Killer II
0.10% Cyfluthrin
1.00% Propoxur
0.25% Pyrethrins
1.00% Piperonyl Butoxide

e) Laser House and Garden Multipurpose Insect Killer
0.04% Cyfluthrin
0.35% Tetramethrin
1.00% Piperonyl Butoxide

Application Rates: 0.04 and 0.1% sprays

Usual Carriers: organic solvents; water

Limitations: For Domestic Indoor and Outdoor Use Only

3. SCIENCE FINDINGS

Summary Science Statement:

Technical cyfluthrin does not exhibit high mammalian toxicity. It is not considered to be mutagenic or teratogenic and is not a skin sensitizer. The results of the acute toxicity on the domestic use formulations indicates that the chemical is of low toxicity. Cyfluthrin has been tested in several studies (rat, mouse, chicken, dog) for possible delayed type neurotoxicity and has been shown to be neurotoxic when administered at relatively high dosage levels under certain conditions. However the neurotoxic dose levels were considerably higher than those which elicited other signs of toxicity indicating that cyfluthrin should not exhibit delayed type neurotoxicity under conditions of use. Chronic feeding and oncogenic studies indicate that cyfluthrin is not an oncogen.

Sufficient data are available to characterize cyfluthrin from an environmental fate and ecological effects standpoint. Cyfluthrin is extremely toxic to fish and aquatic organisms but is practically non-toxic to upland game birds and waterfowl. An acute contact LD_{50} study indicated that cyfluthrin is toxic to the honey bee with an LD_{50} = 0.037 mg/bee. Cyfluthrin undergoes rapid photolysis, is readily degraded by soil and is relatively insoluble in water. There is little or no potential for leaching.

A tolerance assessment is not needed because the registered use pattern is for non-crop/non-food use. There are no data gaps.

Chemical/Physical Characteristics of the Technical Material

Physical State: liquid
Color: dark amber
Odor: aromatic solvent odor at room temparature
Melting Point: not applicable
Vapor Pressure: 2.1 x 10-8 mbars
Density: 0.830 + .005 g/ml
Solubility: 0.002 mg/ml at 20°C in water
pH: 5.6
Octanol/Water Partition Coefficient: 4.2×10^4

Toxicological Characteristics:

Technical Cyfluthrin

Acute Oral (Mouse): males: 291 mg/kg Toxicity Category II
83.6% females: 609 mg/kg

Acute Dermal:
LD_{50} > 5000 mg/kg Toxicity Category III
21-day Dermal (rat):
LD50 > 5000 mg/kg Toxicity Category III
Primary Dermal Irritation (rabbit):
none observed Toxicity Category IV
Skin Sensitization (guinea pig):
not a sensitizer
Acute Inhalation: LC_{50} (4 hour) | males - >0.735 mg/l
| females - 0.200 - 0.735 mg/l

Teratology: (rat) Maternal NOEL = 3 mg/kg/day
Maternal LEL = 10 mg/kg/day
Fetotoxic NOEL = 30 mg/kg/day
Teratogenic NOEL = 30 mg/kg/day

2-Year Feeding/Oncogenicity: (rat) Oncogenic NOEL = 22.5 mg/kg/day
Systemic NOEL = 2.5 mg/kg/day
Systemic NOEL = 7.5 mg/kg/day

Gene Mutation: negative
Structural Chromosome Aberration: negative
Unscheduled DNA Synthesis: negative

Laser Formulations

Acute Oral Toxicity in rats:	Toxicity Category IV
LD_{50} = >5000mg/kg	
Acute Dermal Toxicity in rats:	Toxicity Category III
LD_{50} = >2000mg/kg	
Acute Inhalation:	Toxicity Category IV
LC_{50} = >5mg/l	
Primary Eye Irritation:	Toxicity Category IV
Primary Dermal Irritation:	Toxicity Category IV
PIS = 0.9	
Dermal Sensitiztion: not a sensitizer	

C. Physiological and Biological Characteristics

The mode of action in biological systems is stomach and contact exhibiting neuropathological characteristics typical of pyrethroid insecticides. Slight repellant effect.
Foliar absorption: N/A
Translocation: N/A

D. Environmental Characteristics

Adequate data are sufficient to define the fate of cyfluthrin in the environment. Cyfluthrin is stable to hydrolysis at environmental pH and temperature and to photolysis. It photodegrades rapidly with a half-life of <2days at ph 9. The major degradate is 4-fluoro-3-phenxyl-benzaldehyde Under the conditions of the soil TLC test using various soils, (aged and unaged) cyfluthrin residues are considered immobile in soils with a half-life of 56 to 63 days in German loam and sandy loam, respectively. Anaerobic conditions did not alter either degradation rate or products. Cyfluthrin's solubility in water is determined to be 2ppb (20°C). It has a bioaccumulation factor in fish of 858X. Residues are depurated radidly in untreated water. Accumulated residues are found in non-edible tissue. Cyfluthrin and its degradates do not leach into the soil. There are no concerns at this time in regard to ground water.

E. Ecological Characteristics

Avian Acute Oral: Bobwhite quail - LD_{50} > 2000 mg/kg
Avian Subacute Dietary: Mallard duck - LC_{50} > 5000 ppm
Bobwhite quail - LC_{50} > 5000 ppm
Freshwater Fish: Bluegill - LC_{50} = 1.5 ppb
Rainbow Trout - LC_{50} = 0.68 ppb
Freshwater Invertebrate: Daphnia magna LC_{50} = 0.14 pptr
Marine/Estuarine Invertebrate: Mysid shrimp - LC_{50} = 2.42 pptr
Eastern Oyster EC_{50} = 3.2 pptr
Marine/Estuarine Fish: Sheepshead minnow - LC_{50} = 4.05 ppb

4. Summary of Regulatory Position and Rationale

The Agency has determined that it should allow the registration of cyfluthrin for domestic indoor and outdoor use for control of household pests, such as fleas, cockroaches, garden insects. Adequate data are available to assess the acute toxicological effects of cyfluthrin to humans. Since no crop, food or feed uses are proposed, a tolerance assessment is not necessary. As is typical of synthetic pyrethroids, technical cyfluthrin is highly toxic to aquatic organisms (invertebrates and fish). However, the proposed use patterns should not pose any environmental hazard. None of the criteria for unreasonable adverse effects listed in section 162.11(a) of Title 40 of the U.S. Code of Federal Regulations have been met or exceeded for this use.

5. Summary of Major Data Gaps

There are no data gaps for the domestic indoor/outdoor use.

6. Contact Person at EPA

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